UNITING PEOPLE AND SCIENCE FOR CONSERVATION

VERMONT CENTER FOR ECOSTUDIES
ANNUAL REPORT | 2016
MISSION

The Vermont Center for Ecostudies (VCE) advances wildlife conservation across the Americas through research, monitoring, and citizen engagement.

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Cover photo: © Charles Gangas
DEAR VCE FRIENDS AND SUPPORTERS,

In October, I joined a VCE-led group of birding enthusiasts on Monhegan Island in Maine. This trip was a first for VCE. Although the birding was fairly quiet by Monhegan standards, the assembled group had the chance to experience how singular this organization is. Throughout the long weekend we shared stories, watched birds, observed Monarchs hatching, and hiked, all while being stewarded by a group of biologists eager to share their knowledge, but also willing to listen and learn from the collective intelligence of the assembled participants. What a great attribute. I have found this to be a consistent characteristic of the entire staff at VCE.

Over the past five years, I have been fortunate to spend many amiable hours with the VCE staff. Whether on Mount Mansfield, at a biannual retreat, skiing, biking, or hanging around a fire on a cool fall evening. I have had the chance to understand what galvanizes this incredible group. Bringing their individual passions and curiosity to bear, they conduct science and pursue conservation by engagement – sharing, challenging, advising, and inspiring citizen scientists, policy makers, conservation practitioners, scientific peers, and the general public. Foremost, VCE is engaged in science that is vested in our future. While we reflect on and celebrate the first ten years of this vibrant organization, it is clear that VCE is looking ahead. VCE’s work will make a difference to our changing natural world, to species and habitats directly, and to the way people understand and relate to nature.

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PETER BROOKE
DID SOMEONE SAY TEN YEARS?

The past decade surely has flown by. Those of us who founded VCE—officially on 1 October 2007—can scarcely believe that our 10-year anniversary approaches. While much has changed around us, necessitating shifts in conservation priorities and approaches, the heart of VCE and what we do has not. And, I daresay it won’t.

Reflecting on our first decade, I see evidence that VCE has found success while remaining unique in the non-profit community and true to our core values. Here are a few examples:

SURVIVAL. We’ve survived; moreover, we’ve flourished. When we struck out on our own, there were no guarantees that VCE would be thriving ten years later. We’ve nearly doubled our staff from 6 to 10, increased our budget from $500,000 to over $1 million, grown our donor base from 500 to almost 1,000 individuals, and finished every year in the black. VCE is by all accounts a “going concern.”

COMMUNITY. We have built a vibrant, loyal community. It starts with our extraordinary staff, extends to our dedicated Board and Advisory Council, and culminates with our hundreds of citizen scientists, supporters, and conservation partners. This community binds together the entity that we call VCE in a powerful and enduring way.

CONSERVATION SCIENCE. Since 2007, VCE staff have provided senior authorship on 20 peer-reviewed papers and co-authorship on 40 others. Our full life cycle conservation efforts literally span the hemisphere, from Canada to Argentina, the Caribbean to Galapagos, and Maine to Oregon.

COMMUNICATION. We’ve truly “upped our game” in conservation science communication. The evidence is tangible: Outdoor Radio, Suds & Science, Field Notes, our web site, this annual report, and, of course, social media. We’re continually stretching to reach more people, more effectively.

MENTORING. We take special pride in our longstanding mentorship of young conservation biologists, many of whom are now established professionals, some active VCE collaborators. Our commitment to local and international mentoring is a core VCE value.

What will the next decade bring? A redoubled commitment to maximizing the conservation outcomes of our projects. Working at the frontiers of citizen science. Deliberate planning for leadership and governance that will carry us strongly into the future. We will likely continue to grow in size and scope, but we’ll carefully retain the personability and collegiality that are VCE hallmarks.

Conservation is about people, after all. While our conservation science targets wildlife and their habitats, VCE’s work always comes down to people, to you. Thanks for helping us achieve another banner year in 2016.

CHRIS RIMMER
Mountain Birdwatch
by John Lloyd

Mountain Birdwatch (MBW) is one of VCE’s most enduring citizen-science projects, and one of our most vital; 95 volunteers completed survey routes in 2016.

As for many of the species whose populations are tracked each year by MBW, the conservation status of Bicknell’s Thrush would be a mystery were it not for this project. This year Jason Hill and John Lloyd had a paper accepted for publication in the peer-reviewed journal Ecosphere, presenting the first-ever, fine-scale estimate of Bicknell’s Thrush abundance throughout the northeastern U.S.

Further, MBW data played a critical role in informing updates to the newly revised Conservation Action Plan for Bicknell’s Thrush and is providing key scientific guidance as the US Fish and Wildlife Service decides whether to officially designate Bicknell’s Thrush as a Federally Threatened species in 2017.

Looking ahead, 2017 promises to be a pivotal year for Mountain Birdwatch. We will celebrate the project’s 17th year by releasing a State of the Mountain Birds report. We will also initiate a process to modernize and update MBW data management. Our goals are to improve the data-entry experience for our citizen scientists and to create tools that will allow users to explore MBW data online, making these hard-earned data more accessible and useful to more people.
VERNAL POOLS
Mercury in the food web
by Steve Faccio

Although vernal pools are not conspicuous features of our landscape, these small, ephemeral wetlands provide critical breeding habitat for several amphibian species and many invertebrates. Vernal pools in the Northeast are subject to airborne mercury contamination due to their position downwind from mercury-emitting coal-fired power plants and incinerators in the Midwest. In its inorganic form, mercury tends to bind to soil, preventing this neurotoxin from entering the food chain. Problems arise when certain landscape and chemical conditions enhance the transformation of mercury to its more toxic and bioavailable form, methylmercury. Conditions that facilitate this conversion are common to many vernal pools.

With collaborators from Dartmouth College, VCE has led investigations of mercury in vernal pool food webs. Our results indicate that predatory diving beetles bioaccumulate methylmercury at higher levels than detritivores and filter feeders, such as caddisflies and fairy shrimp. In amphibian eggs, methylmercury levels were 10,000 times greater than that of the water. Methylmercury bioaccumulated rapidly in predaceous Spotted Salamander larvae (~50 to 100 times greater than in eggs), and moderately in omnivorous Wood Frog tadpoles (~10 to 20 times greater than in eggs), which could have significant implications for predators of amphibian larvae.

Little is known about thresholds at which mercury affects amphibians. Laboratory studies indicate that some species show no adverse effects at concentrations equal to those we detected, while others suffer impaired growth and reduced survival at levels well below those we documented. Regardless, until action is taken to eliminate mercury emissions, this dangerous toxin will persist in our environment.

SATELLITE TAGS UNLOCK THE MYSTERIES OF UPLAND SANDPIPER MIGRATION
by Jason Hill

Our ambitious project with the Department of Defense Legacy Resource Management Program yielded new insights into the annual movements of Upland Sandpipers in 2016.

Working closely with the Legacy Program, we deployed 15 satellite tags on Upland Sandpipers at three military bases in Kansas and Massachusetts during the summer of 2016. Four of those sandpipers received solar-powered tags that send us their precise daily location via email. Yes, you read that correctly—Upland Sandpipers can now send email (or at least their tags can).

Our satellite tags have provided the first-ever direct evidence of the pathways that these sandpipers take upon leaving their breeding grounds. Two tagged birds flew non-stop from the northeastern U.S. over part of the Atlantic Ocean and Caribbean Sea to Venezuela, while a Kansas-tagged female flew non-stop from Texas to Colombia, crossing the Gulf of Mexico and skipping over the Pacific Ocean. Since we tagged this bird in April 2016, she has visited ten other countries and traveled >10,000 km on her way south to Uruguay.

A primary goal of our research is to catalyze coordination of conservation actions and management of this vulnerable species throughout its entire life cycle and across its year-round range. Prior to our work, this type of outreach and information sharing simply was not possible.
Forest Bird Monitoring

Volunteers monitor breeding birds on 31 sites across Vermont in one of the continent’s longest-running studies of forest bird population trends.

eBird

In addition to the 1,880 data contributors, behind-the-scenes eBird experts called County Coordinators vet submitted data and educate users.

eButterfly

Volunteers report and explore sightings and photos of butterflies across North America.

iNaturalist

Volunteers share observations of all Vermont biodiversity in this digital project of the Vermont Atlas of Life.
“eButterfly is getting me hooked on watching butterflies!”
— CHRISTOPHER RUNK

A VOLUNTEER’S PATH
by Sarah Carline

Uniting People and Science for Conservation: VCE’s motto rings true for me. I began volunteering six years ago, hoping to give back to the community in the name of conservation, science, and birds. With an interest in loons and kayaking, LoonWatch was a natural fit for me. This single-day commitment was fateful, however; I soon became a weekly volunteer in VCE’s office. Surrounded by a strong, lively group of people who truly care about science-based conservation and the citizen scientists who underpin their efforts, I developed a closer connection with VCE’s everyday work, and my involvement broadened.

Soon, I was hiking up mountains to survey high-elevation forest birds for Mountain Birdwatch, then returning to the office to help error-check the project’s data. I opened accounts with eBird and iNaturalist’s Vermont Atlas of Life, and my circle of naturalist colleagues grew ever wider. As my birding skills developed, I began conducting surveys for the Forest Bird Monitoring Program. Then, branching out beyond birds, I tackled pollinators, joining the Vermont Bumblebee Survey and rapidly gaining a new interest.

Three years ago, I learned of VCE’s search for a rare breed of volunteer, one willing to conduct nocturnal surveys for Whip-poor-wills. Now, I spend moonlit summer nights listening for the nightjar’s lively calls, interspersed with hooting owls and yipping coyotes. I look forward to summer like never before!

Over the years, the VCE staff has wholeheartedly supported my efforts, engaging and encouraging me as I became absorbed in each volunteer task. I’ve learned more than I ever dreamed possible about the natural world, while teaming up with committed biologists who work to safeguard vulnerable wildlife. In turn, I hope to share my passion for conservation with others. I highly recommend a journey with VCE to learn, grow, and engage with the best!

Mountain Birdwatch
Each June, volunteers complete bird survey routes on 123 mountaintops across the Northeast.

Loon Watch
Each July, volunteers conduct a one-day census of Vermont’s breeding loons.
In 2016, VCE expanded efforts to conserve grassland bird habitat on private lands. We provided bird-friendly management advice to owners of 356 acres of open land, offering site-specific guidelines that strike compromises between the needs of grassland birds and farmers. On lands used for forage production, we partnered with the Natural Resources Conservation Service to secure financial support for habitat improvement. We’ve initiated discussions with New England land trusts to integrate grassland bird-friendly practices into agricultural conservation easements, a collaboration that will be expanded in the coming year to include landowner education on ecological approaches to land stewardship.
Outdoor Radio
VCE continues its successful collaboration with Vermont Public Radio (VPR) through our monthly audio feature, Outdoor Radio. With VPR’s production engineer, Chris Albertine, Kent McFarland and Sara Zahendra venture ever further afield to bring the sounds and science of Vermont’s biodiversity to VPR listeners. Broadcast twice monthly, the program is available anytime here: www.vtecostudies.org/outdoor-radio/

SUDS & SCIENCE
VCE’s public science discussion series reached new heights in 2016. Held monthly (January-May & November) at the Norwich Inn, VCE biologists, colleagues, and interested community members gather for informal talks featuring cutting-edge science. An average of 45 guests attend and invariably linger after the scheduled hour to continue dynamic conversations. Professor Jeremy DeSilva’s program on the recent discovery of an early Hominid species in South Africa was a 2016 highlight. Most programs are recorded by a videographer from CATV Community Access Television, effectively doubling our audience and affording access to constituents far and wide. http://www.vtecostudies.org/suds-and-science/

This show made me say out loud “No way! Awesome!”, “Cool!”, and laugh out loud to the reactions of Kent and Sara climbing into the beaver lodge. What a fun show! I loved it!”

— OUTDOOR RADIO LISTENER

Jeremy DeSilva’s program on the recent discovery of an early Hominid species in South Africa was a 2016 Suds and Science highlight.
LEADERSHIP & INNOVATION

State of Vermont Honors VCE’s Kent McFarland

Kent McFarland may be outsized in stature and personality, but he has never been one to trumpet his successes, of which there are many. That’s his VCE colleagues’ job, though we practice restraint and selectivity in bestowing our adulations! In December, Kent received an extraordinary honor from the State of Vermont, one that makes every one of us at VCE justifiably proud. Our very own “Kapt. Krummholz” was awarded the 2016 Sally Laughlin Award for the Conservation of Endangered and Threatened Species. This first-time award from the Vermont Agency of Natural Resources “recognizes individuals who have advanced the knowledge, understanding, and conservation of Endangered and Threatened species and their habitats in Vermont.” It honors VCE Advisory Council member and Endangered Species Committee founder Sally Laughlin for her exceptional efforts over 30+ years on behalf of wildlife conservation in Vermont. The award brings well-deserved recognition to Kent, longtime chair of the Invertebrate Scientific Advisory Group, for tirelessly sharing his unabashed zeal and deep knowledge of the natural world with all Vermonters. Whether through his exuberant exclamations on Outdoor Radio, his leadership in conserving Vermont’s pollinators, his 25 years of expertise on montane bird ecology, or his stunning photography, Kent has been around the conservation science block. He is a vital cog in the VCE wheel, a dynamic colleague and friend, and a passionate naturalist. Congratulations, Kent — keep it up!
The Vermont Atlas of Life (VAL) is a rapidly growing catalog of Vermont’s animals, plants, fungi and microorganisms – an online, real-time resource with maps, photographs, and data open for anyone to use. Data sharing has become an important issue in modern biodiversity research to address large-scale questions and conserve species. As the need to understand how the planet is changing grows ever more urgent, so does the problem of accessing and analyzing historic data. The age of recording observations with paper and pencil may be over, but irreplaceable data gathered in this way (or stored on obsolete floppy disks) for decades or even centuries offer insights into how species’ abundance, distribution, and phenology are changing. VCE is working with partners to recover these historic data and bring them to light — digitizing, archiving, and making them widely available for use in science and conservation.

Dr. Ross Bell studied ground beetles worldwide during his 55-year career as a biology professor at the University of Vermont. With the help of his wife, Joyce, and hundreds of students through the decades, Dr. Bell scoured Vermont and New Hampshire in an effort to elucidate species’ distributions. After each field trip, Dr. and Mrs. Bell would identify the ground beetles they collected and then open one of four binders filled with a page for each species, marking a dot where each was collected. Decades passed, and it was clear that the Bells and their students had assembled a treasure chest of insect biogeography for science and conservation. To be most useful, it needed to be digital. The Vermont Atlas of Life, with the help of volunteers, painstakingly mapped each hand-drawn dot into a geodatabase. A lifetime of work on the ground beetles of Vermont and New Hampshire has reached fruition and is now available in Carabidae of Vermont and New Hampshire; work is underway to share it digitally through VAL. The work has already led to the designation of 37 ground beetles as Species of Greatest Conservation Need in Vermont.

“...
“You’re doing a great job in ornithology, expanding VCE’s reach throughout the Americas and inspiring citizen scientists with your excellence, vision, energy and achievements.”

— MICHAEL BIRO
BUILDING A NETWORK OF GRASSLAND LANDSCAPES IN THE MIDWEST

by Rosalind Renfrew

In the heart of North America’s grasslands, bird populations have undergone long-term declines. While conservation programs have successfully maintained some breeding habitat, these have not occurred at scales adequate to overcome chronic losses. In an effort to stabilize grassland bird populations, the US Fish and Wildlife Service Migratory Bird Program tasked VCE with creating a comprehensive, online mapping platform for the Midwest. The resulting Conservation Atlas for Midwest Grassland Birds integrates land use, economic, and bird survey data to identify landscapes with the greatest opportunities to conserve grassland birds, and to elucidate gaps in existing conservation activities. This tool identifies where grassland habitat values overlap with economic factors and ecosystem services such as land value, erosion control, and carbon sequestration potential. It enables decision-makers to assess tradeoffs of program, policy, or land protection options, and provides conservationists the means to allocate resources more efficiently, with a unified vision.

Once the Atlas was in hand, VCE engaged planners and scientists to develop bird conservation objectives that uphold the ecological and societal values of native, restored, and surrogate grasslands. VCE co-organized a multi-disciplinary seminar at the University of Minnesota, tapping experts from myriad backgrounds such as social science, agribusiness, public policy, and ecosystem services valuation. This seminar charged participants with creating strategic options to scale up local conservation successes and develop innovative, large-scale solutions.

By convening collaborators from across sectors and arming them with useful maps at a variety of scales, VCE helped to advance collective conservation efforts to achieve lasting impact for grassland birds.
Volunteer Birders: the Backbone of Forest Bird Monitoring

by Steve Faccio

Since 1989, volunteer birders have crawled out of bed in the pre-dawn hours to put their bird identification skills to work for the Vermont Forest Bird Monitoring Program. This core VCE project started with 11 study sites, but grew steadily and by 2012 consisted of 31 sites, all located in unmanaged, mature interior forests. Each June, dedicated birders fan out across Vermont and systematically survey their routes at dawn, contributing to a database that has amassed more than 62,000 observations of 135 species from some 800 individual surveys.

VCE recently summarized the insights generated by these skilled volunteers in our landmark report, *The Status of Vermont Forest Birds: A Quarter Century of Monitoring*. Over the last 25 years, we found that the number of birds detected dropped by 14%, from an average of 14.8 birds per point over the first five years to 12.7 over the last five years. The report also details population trends for 34 species, of which 13 declined significantly while only eight increased. Further, it discusses land conservation and forest management strategies that will help sustain a diversity of forest birds.

The contributions of our 59 hardy volunteers represent a huge undertaking of time and effort, not to mention a cost-efficient method of collecting scientific field data. Conducting 800 bird surveys at study sites all over Vermont equates to approximately 4,500 hours of time. Employing field technicians to survey all those sites would have cost VCE nearly $75,000, not including travel reimbursement! We extend our heartfelt thanks to these devoted citizen scientists—without their extraordinary skills, perseverance, and commitment this project would not be possible.

Read the full report: vtecostudies.org/projects/forests/vermont-forest-bird-monitoring-program/
A NEW PLATFORM FOR CONSERVATION IN HAITI
by Juan Carlos Martínez-Sánchez

Achieving conservation in a developing country presents extraordinary challenges; doing so in Haiti adds another level of complexity. Socioeconomic instability, rotating government officials, and lack of reliable funding make it difficult to accomplish tangible results. That’s why it took Françoise Benjamin and other students from Université Quisqueya three years to form and legalize Action pour la Conservation Biologique (ACOBI), their new NGO devoted to conserving the remnants of Haiti’s natural heritage. Thanks to steady mentorship by Juan Carlos Martínez-Sánchez, VCE’s former Caribbean Conservation Coordinator, Françoise and other students have received extensive training in biological inventories, experimental design, and more importantly, strategic thinking to advance Haiti’s conservation priorities. In 2016, Françoise and Juan Carlos joined forces to spearhead a crowdsource funding initiative to investigate the impact of communication antennas on endangered Black-capped Petrels. Not only did they raise more than $5000 in a record three-week period, they received a considerable number of donations from Haitians, no small accomplishment in a country with a chronic shortage of resources. We are sure that Françoise will build on this success and use her enthusiasm to inspire other young Haitian professionals. Raising awareness of the importance of Haiti’s biodiversity is a first step on the path to conservation of Haiti’s treasured natural communities. Good luck Françoise!

NEXT STEPS FOR LOONS
by Eric Hanson

After four decades of monitoring and management, Vermont’s loons just don’t know when to quit. Most quality habitat is now occupied and competition between territorial loons is on the rise. But the population has not begun to level off, as we might expect; we identified six new nesting pairs in 2016, five in areas we would label “high risk” due to human activity.

We – VCE, our volunteers, partners, and the state of Vermont – manage loons intensively, using a variety of tools: nesting rafts on lakes without safe natural sites, nest warning signs to discourage human interference, and outreach to lakeshore landowners and recreationists. As human use and development pressure have increased on Vermont lakes, these management activities have allowed loons and people to coexist on highly developed and very busy lakes.

While state funding has changed little since 1999, we are managing a loon population that has almost tripled since that time. Facing limited resources, we have adjusted the program’s priorities, focusing on high-risk sites on busy lakes and reducing our outreach and monitoring on others.

Yet we are aware that reducing management efforts too drastically could compromise Vermont’s unique, long-term data set on the species, not to mention the gains that loons have made. Time spent engaging volunteers leverages VCE’s resources and builds a community of loon advocates and donors. Involving volunteer loon enthusiasts promotes local participation in this singular conservation program, unmatched in its success in rescuing a species from the brink of extirpation.

From a strictly scientific perspective, Vermont’s loon population could likely handle more breeding failures and still remain healthy. In the coming years, we will examine our nearly 40-year dataset to inform decisions about what management Vermont’s loons require, and what level of monitoring is essential.

Our volunteers are critical conservation partners. Together, we will ensure that the wails and yodels of loons echo across Vermont’s lakes for generations to come.
The figures that appear in the financial summary shown above have been audited and received an unqualified opinion.

### PROFIT AND LOSS STATEMENT

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|                                |        |        |
| **NET INCOME**                 | $266,200* | $21,882 |

* Includes $110,280 raised to help fund the Alexander Dickey Conservation Internship into the future.

### BALANCE SHEET

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|                                |        |        |
| **TOTAL LIABILITIES AND NET ASSETS** | $908,782 | $680,558 |

### DONORS

**LEADERS**

- **$10,000+**
  - Anonymous (4)
  - Bailey Charitable Foundation
  - Binnacle Family Foundation
  - The Bobolink Foundation
  - Richard Bowe and Karen Nemeth
  - Peter A. Brooke Fund at the Boston Foundation
  - Peter W. and Ruth H. Brooke Fund at the Boston Foundation
  - Mrs. Charles B. Curtis
  - Erika and Brian Dade
  - Closey E. Dickey
  - Stephen Whitney Dickey, Jr.
  - Bruce and Clo Giffen
  - Annette Gosnell*
  - Gale Hurd
  - Jared and Songmei Keyes*
  - Warren and Barry King
  - Charlie and Clare Rimmer*
  - TechFoundation

**GUARDIANS**

- **$5,000 to $9,999**
  - Anonymous (2)
  - The Jack and Dorothy Byrne Foundation
  - Claudia and Peter Kinder Charitable Fund of the Vermont Community Foundation
  - Sydney Lea and Robin Barone
  - Peter Lindsay and Katie Murphy
  - Lock and Lube, LLC
  - John and Carolyn Marsh
  - Winifred McDowell and John Follett
  - Harriet S. Mitiguy Living Trust
  - Mr. and Mrs. John Mullin
  - The Oakland Foundation
  - Nancy Osgood
  - Walter and Barbara Paine
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